

**A Report on Prosthetic and Orthotic
Service Supply and Demand
in Central America**

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by

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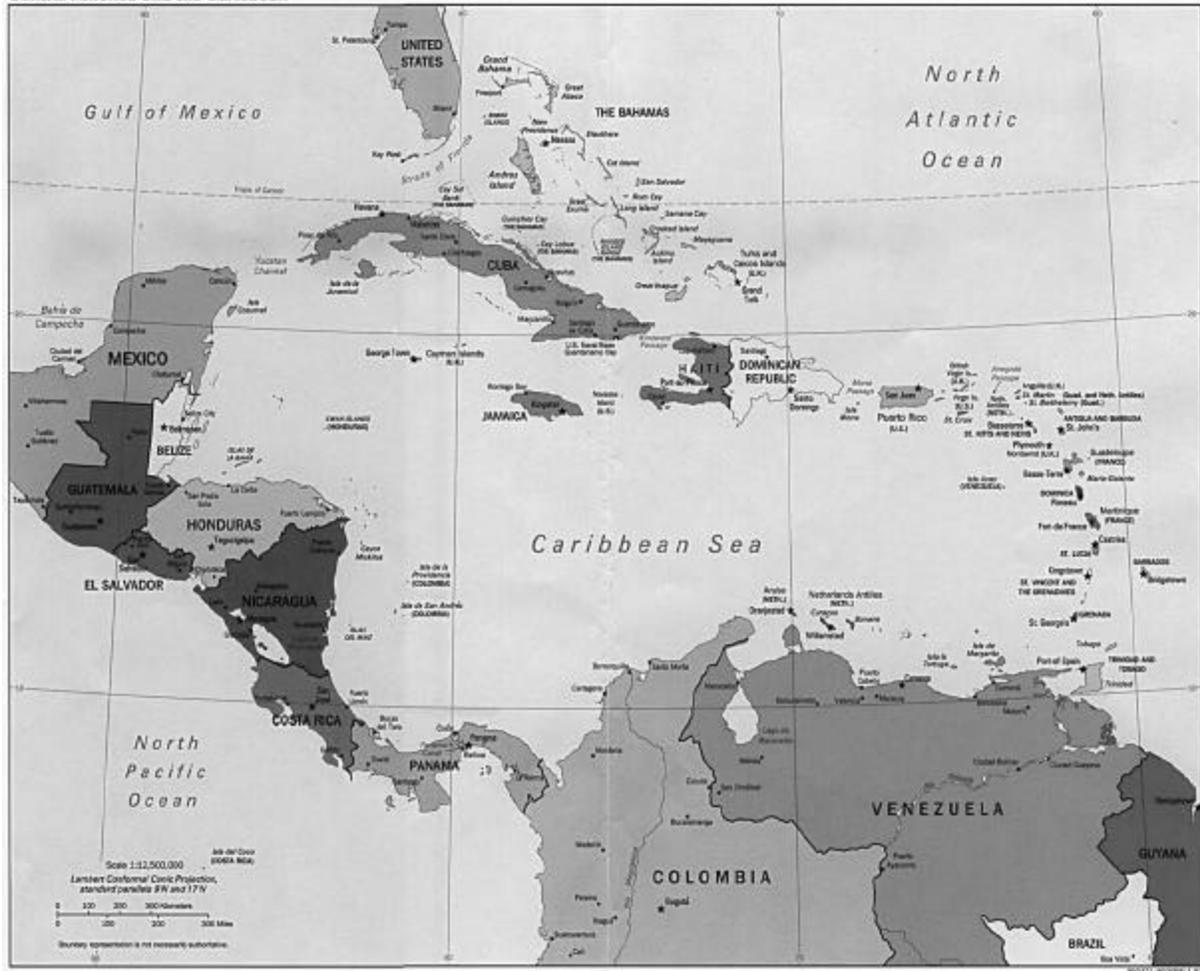
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Acronyms

AFO	Ankle-foot orthoses
AGREL	Asociación Guatemalteca de Rehabilitación (Discapacitados Fisicos) (Gautamalan Association of Rehabilitation [for the Physically Disabled])
AK	Above knee
BK	Below knee
BUFA	German school for the training of prosthetists and orthotists
CADEG	Centro de Atencion a Discapacitados del Ejercito de Guatemala (Center for the Attention of the Disabled of the Army of Guatemala)
CADERH	Centro Asesor para el Desarrollo de los Recursos Humanos de Honduras (Advisory or Teaching Center for the Development of Human Resources for Honduras)
CBR	Community-based rehabilitation
CENAPRORTO	(National Center for Prostheses and Orthoses in Nicaragua)
CENARE	Centro Nacional de Rehabilitacion (National Center for Rehabilitation [in San Jose, Costa Rica])
CERPROFA	El Centro de Rehabilitación Profesional de la Fuerza Armada (The Center for Professional Rehabilitation of the Armed Forces [in El Salvador])
CPO	Certified Prosthetist-Orthotist
CRIT	Centro de Rehabilitacion Integral–Teleton (Center for Integral Rehabilitation–Teleton in Honduras)
FUNDABIEM	Major Guatemalan TELETON foundation
FUNTER	Fundación TELETON por Rehabilitación (TELETON Foundation for Rehabilitation)
GTZ	German Technical Assistance Agency
ICRC	International Committee for the Red Cross
IGSS	Instituto Guatemalteco de Seguridad Social (Guatemalan Institute for Social Security)
INTECAP	Instituto Tecnico de Capacitacion y Productividad de Guatemala (Guatemalan Technical Institute for Training and Productivity)
ISPO	International Society of Prosthetics and Orthotics
ISRI	Instituto Salvadoreño de Rehabilitación de Invalidos (The Salvadoran Institute of Rehabilitation for the Handicapped)
MOH	Ministry of Health
MOL	Ministry of Labor
NGO	Nongovernmental Organization
P&O	Prosthetics and Orthotics
PAHO/WHO	Pan American Health Organization/World Health Organization PODS
POLUS	POLUS Center for Social and Economic Development
PRODINIC	Nicaraguan organization of and for the disabled of Nicaragua
SACH	Single axis cushion heel

TELETON	Organization that hosts telethon fundraising activities to support integral (including medical) rehabilitation centers serving children
USAID	U.S. Agency for International Development
WRF	World Rehabilitation Fund

Central America and the Caribbean



Recommendations

A more extensive list of recommendations can be found in Section 7 of this report.

The team's recommendations can be broken down into three major areas: 1) Demographics, statistics, and information; 2) education and training; and 3) support and actualization of P&O service. Below is a list of recommendations by category without any particular prioritization.

Demographics, statistics, and information:

1. Implement a national health registration number.
2. Implement a national health database.
3. Develop realistic statistical numbers concerning mobility related disabilities.

Education and training:

1. Implement multidisciplinary team training.
2. Provide internationally shared funding of upgrade training.
3. Continue support of the Don Bosco/GAZ. University level prosthetics/orthotics training program.
4. Develop a scholarship trust fund.
5. Change the title earned with ISPO category-II university diploma from "Técnico" to "Tecnólogo" in prosthetics and orthotics.
6. Establish realistic numbers of ISPO category II trained prosthetists and orthotists needed in each country with a long-term calendar of training upgrades needed to meet these goals.
7. Provide adequate technical training to all support personnel.
8. Provide education on disabilities to amputees and their families.

Support and actualization of prosthetic and orthotic services:

1. Develop or improve the prosthetic and orthotic (P&O) workshops or labs. This activity should be given priority in regards to accessibility, human resources, facilities, equipment, and the types of services provided so that all the facilities have equal services.
2. Decentralize medical rehabilitation (including P&O) outside the capital cities to allow maximum accessibility to those in need.
3. Implement an (or use an existing) appropriately supervised CBR program with adequately trained workers.
4. Develop (or discover existing) manufacturing capabilities in the region for quality, regionally appropriate prosthetic and orthotic components and supplies.
5. Develop a machinery and equipment bank that can accept used, but serviceable, P&O machinery and equipment.
6. Develop a private enterprise bank to loan money for P&O private lab start ups.

7. Allow government facilities the ability to solicit competitive bids directly from manufacturers for imported components.
8. Develop a workable materials-purchasing cooperative to take advantage of quantity discounts and shipping expense savings.
9. Include an impact statement on private sector services in any regional master plan and encourage inclusion of the private sector in the provision of medical rehabilitation services and upgrade training.
10. Allow private facilities to participate in providing services from internationally funded projects with guidelines established to maintain quality and timely delivery of services at a price that recognizes “*real costing*.”
11. Implement documentation of services in P&O workshops.

1. Introduction

The information included in this report was gathered during two weeks of travel to El Salvador, Guatemala, Honduras, Nicaragua, and Panama. The evaluation team visited 20 institutions or centers run by governmental or nongovernmental agencies and three private orthotic-prosthetic (O&P or P&O) offices and attended three dinner meetings. The evaluation team garnered information from formal discussions at each institution, from informal private conversations during the trip, and from assorted handouts.

Where applicable, information has been included from a previous consultation report by John Craig on the January 1999, Nicaragua POWER (Prosthetic and Orthotic Worldwide Education and Relief) conference on P&O needs for that country and region.

2. Regional Situation

2.1 Background

Many of the countries of Central America, with a total land mass about the size of Illinois and California¹ combined, and its population of more than 32 million,² have similar problems when it comes to medical rehabilitation health care. Health care is concentrated in capital cities, making it difficult to access from rural areas because of the long and costly journeys (it often takes several trips to get to the point of receiving service); there is limited governmental or other insurance coverage; sometimes the language is different; and the costs are often prohibitive because of the travel expenses and high-priced imported materials needed to supply the service, especially as it relates to prosthetics and orthotics compared to the average annual income in the region. (Belize has almost no medical rehabilitation services, but its size [a population of +/- 200,000³] makes it difficult to concentrate any significant effort there.) Armed conflict and natural disasters have only exacerbated an already strained delivery system.

Many NGOs and international aid agencies such as World Rehabilitation Fund (WRF), Pan American Health Organization/World Health Organization (PAHO/WHO), International Committee for the Red Cross (ICRC), German Technical Assistance Agency (GTZ), U.S. Agency for International Development (USAID), various national Telethons, and the UN have been working on various development projects for 10 years or more. Many of the professionals have received international training (for example prosthetists and orthotists have been trained in Mexico, the Dominican Republic, Brazil, Chile, and Argentina), but returned home only to find no positions available in their specialty. If positions were available, then no facilities, equipment, supplies, or materials existed to practice their profession.⁴ Basic education can be an impediment to getting upgrade training because illiteracy often runs 30 percent or more. In some countries, only 30 percent of the population has a secondary education.⁵

2.2 Medical Rehabilitation Needs

The countries reviewed that need development of medical rehabilitation services are Nicaragua, El Salvador, Guatemala, and Honduras, which together have a land area that is slightly smaller than the size of California and a population of approximately 26 million. Using WHO estimates

¹ Britannica Junior Encyclopedia; numbers compiled from numerous volumes; (1981); Encyclopedia Britannica, Inc.; Chicago, Illinois.

² Keller, Nancy et al (Sept. 1997); Central America on a Shoestring, 3rd edition; Lonely Planet Publications; Hawthorn, Australia; compiled figure from each country's population.

³ Ibid.

⁴ Two examples are the CENARE rehabilitation hospital in San Jose, Costa Rica, and CRI in Panama City, Panama.

⁵ Keller, Nancy et al (Sept. 1997); Central America on a Shoestring, 3rd edition; Lonely Planet Publications; Hawthorn, Australia. From chapters on these four nations under "Education."

that indicate 0.5 percent of any given population has mobility disabilities,⁶ it is estimated there are 130,000 disabled persons in those countries with a minimum resultant need of 130 well-trained prosthetists and orthotists (1 P&O per every 1,000 disabled persons). Numbers presented by GTZ⁷ a few years ago suggest a population of 27.2 million people for these countries, with the number of mobility-disabled persons in need of P&O devices estimated at 217,600 (0.8 percent) and a resultant (maximum:1 P&O per every 500 disabled persons) need of 435 ISPO Category II trained prosthetists/orthotists. Medical rehabilitation professionals in these countries said there are approximately 115 persons working in direct P&O service provision (though not all are working directly with beneficiaries) at all levels from orthopedic shoemakers and bench technicians to well-trained P&O technicians. A significant number of prosthetists and orthotists are already partially trained in the region. Prosthetists and orthotists are only a part of the medical rehabilitation team and appropriate numbers of other specialties need to be considered.

Some supplies and materials are available regionally such as polyester resin, leather, metal (although the quality of some of the aluminum and stainless steel is lower), plaster, plaster bandages, some stockinet, shoe repair materials, crepe rubber, and a pelite-like material called Novahul. Polypropylene is available from Colombia. Some attempts are being made to manufacture locally produced prosthetic single axis cushion heel (SACH) feet; however, the quality of these feet is reportedly low.

This report addresses current available prosthetic and orthotic services including manpower, facilities and equipment, and quality of services rendered. It will give an opinion of future needs with suggested training and upgrades. Other issues such as statistics, utilization of the medical rehabilitation team in the provision of services, decentralization of services away from capital cities, local production of quality P & O components, and community-based rehabilitation (CBR) will also be discussed. This report will suggest ways of preserving and expanding private sector services as a way of building sustainability.

⁶ “Guidelines for Training Personnel in Developing Countries for Prosthetic and Orthotic Services”; WHO Consultation; June 1990; Alexandria, Egypt.

⁷ “Formación de Tecnólogos Ortopédicos en El Salvador,” GTZ/University Don Bosco - early edition of the course information booklet.

3. Nicaragua

Nicaragua is among the poorest countries in Central America. Its income is unevenly distributed with unemployment or underemployment hovering at approximately 50 percent.⁸ The country suffered from conflicts for centuries until peace arrived in 1990. Its population, estimated at 4,13,500, is concentrated on the western side, the Pacific lowlands, with 11 major volcanoes and 2 major lakes (Nicaragua and Managua). Four of the country's major cities are located in this region (Managua-pop. est. 819,700; León-124,100; Granada-74,400; and Masaya-80,100). The north central mountain region is a major agricultural area with a smaller population but several larger cities, including Estelí (pop. est. 65,036) and Matagalpa (pop. est. 49,148). The Caribbean region or "Mesquito Coast" occupies about half the country's land area, is covered by tropical rain forest and pine savanna, and receives immense amounts of rain. It is sparsely populated and its two major coastal towns of Bluefields (pop. est. 30,208) and Puerto Cabezas (pop. est. 19,713) are accessible only by river, air, or sea. Juigalpa is (pop. est. 41,792) in its western perimeter but east of Lake Nicaragua.

Major earthquakes in 1931 and 1972 created massive destruction in Managua and the country⁹. The country's highway system is poor, making transportation difficult between regions. During Hurricane Mitch in November of 1998 not only were towns and highways damaged or destroyed, but landmine clearance projects suffered significant setbacks. Discussion with Mr. Barahona on this trip indicated that the current president of Nicaragua is committed to improving the national highway system. This is evident from newly constructed highways and bridge repair projects along the route from Managua to Leon and back to Managua—a triangular route involving several hours of travel on roads much better than would be expected following Hurricane Mitch.

Although many medical services are covered by the Ministry of Health (MOH), prosthetics are, for the most part, not covered. It is estimated that a total of 25 people (including 4 at Juigalpa) are working at all levels of direct P&O service provision in Nicaragua with about two-thirds of that number having direct contact with beneficiaries. The level of training varies dramatically from very little to significant.

⁸ Barahona, Esteban (March 10, 1998); "Report on Need and Supply of Prosthetic and Orthotic Services in Nicaragua" ; Managua, Nicaragua. See pp. 7. Keller, Nancy et al (Sept. 1997); Central America on a Shoestring ,3rd edition; Lonely Planet Publications; Hawthorn, Australia, p.26. Keller's numbers are from 1994 and she indicates the economies of Nicaragua and Honduras are slipping backwards.

⁹ Keller, Nancy et al (Sept. 1997); Central America on a Shoestring , 3rd edition; Lonely Planet Publications; Hawthorn, Australia, pp. 517-588.

3.1 Known Prosthetic and Orthotic Workshops

3.1.1 CENAPRORTO in Managua is the National Center for Prosthetics and Orthotics with a fully equipped workshop, some component production experience, and an equipped mobile outreach unit (which is operational but not currently used due to the expense of operating it). Existing in proximity to Aldo Chavarria Rehabilitation Hospital, it has other medical rehabilitation specialties available including a well-equipped physical therapy gym and an all terrain gait training area. Production has been affected by governmental policy that has shifted the burden for payment of services to the beneficiary or to a benefactor program in a move to privatize services. (This was a two-step process: half the burden was initially transferred, which required that the total amount be paid by outside sources. A PRODINIC representative at the meeting said this policy raised the cost from U.S.\$300 to U.S.\$600. This has caused PRODINIC to consider discontinuing funding of prosthetic devices.)¹⁰

The center has 10 P&Os and 6 support personnel. The medical director, Dr. René Palacio Van Gelderen, is a dental surgeon by profession. Mr. Barahona reported that the practitioners there are paid a bonus of 150 cordobas for each device produced, allowing some to raise their monthly base income of 800 cordobas (+/- U.S. \$67) to 2000 cordobas (+/- U.S. \$167). These bonuses allow some of them to make more than physicians (estimated monthly income of U.S. \$70) or physical therapists (estimated monthly income of U.S. \$100, including income from private patients). There are few opportunities in Nicaragua for physicians to have private clinics. Patients don't like to pay for physician services because they only get "paper" from the doctor, requiring them to go spend more money for medicines. However, some physical therapists provide outpatient services in patients' homes for a fee in addition to their regular job.

This facility produces polypropylene prosthetic components of the ICRC design. The technician doing this says he can produce 10 complete above knee (AK) or approximately 15 complete below knee (BK) units in one day. Wood knee/shins and ankle blocks are also manufactured at the center. Sockets are made of polypropylene or of laminated polyester resin. Prosthetic feet are also produced here (at a cost of U.S. \$10)—a wood-split keel and plantar belting SACH design covered with Novahul (produced in Costa Rica), a foam material similar in makeup to pelite, only softer. The heel cushion was made of a material manufactured in the region that is similar to crepe rubber, but appears to be less durable. Although the foot keel was flat on top, this foot is of questionable quality and durability compared to a low-cost (U.S. \$40) imported SACH foot, such as the one made by Kingsley in the United States and used in the region. Some imported SACH feet were being used in the fabrication process, but the foot of choice was the locally produced foot (due to cost), even though it is often replaced several times a year. Novahul is also used to make soft socket inserts. A supracondylar cuff suspension strap in use with BK prostheses appears to be durable. Orthotic fabrication is of metal and leather as well as polypropylene for

¹⁰ POWER Conference discussion: Managua, Nicaragua, January 1999.

ankle-foot orthoses (AFO). BK socket modifications appeared adequate, but AK socket modification looked suspect—with modified plaster models and finished sockets.

There are three persons remaining who were trained in the ICRC training program from 1986 to 1989. Although the Nicaragua POWER conference "Draft Final Communique," which was distributed after the conference, indicates these persons were trained to ISPO category II standards, it would have to be confirmed with ICRC and ISPO. Two or three others received some training in El Salvador at PODS. The remainder received one to two months training at the center for specific operations that they would be performing. No national statistics are available, but many estimate 25 well-trained P&Os are needed to meet the needs of Nicaragua.

This center is currently in negotiations to reestablish an ICRC-assisted program with ICRC providing its polypropylene prosthetics components manufactured in Switzerland so ICRC can control quality. Mr. Guy Nury of ICRC, one of the engineers who developed those components, has moved to Managua to supervise that program. With their own ICRC component production they now fit all new amputees with this component. Persons who have had other systems are allowed some alternative choices. Preventative Medicine and Rehabilitation (PM&R) physicians prescribe all prosthetic services. Orthopedists can prescribe orthotic services and refer amputees to a prosthetic service consultancy. This service produces approximately 35 prostheses a month.

Needs: The center would like to improve the facilities and expand the types of services available to the public as a cost-recovery activity.

3.1.2 Walking Unidos in Leon is approximately a one and one-half hour drive (about 60 miles northwest) from Managua. This clinic, which is scheduled to open officially in mid-August, is manned by a business administrator, an office administrator, and two staff orthotist-prosthetists with minimal training who are supervised by Mr. Barahona, a chief prosthetist-orthotist who has extensive training and experience including having founded the P&O workshops at AGREL in Guatemala City and at CENAPRORTO in Managua. On a main street, this facility has a handicap accessible entrance; a waiting room; a patient contact room; a gait room; and a separated lab with work benches, a machine room, a plaster modification area, and a materials storage room. This workshop is well equipped with basic P&O machinery, such as a Trautman router or carver, Berkley casting stand and AK brims, an oven for heating sheet plastics to fabricate orthoses or prostheses, a horizontal transfer jig, prosthetic and bench vises, and hand tools and parallel bars. It also has an inventory of supplies and donated, used prosthetic components. Prosthetic fabrication procedures vary by availability of supplies and components, such as imported modular (Otto Bock, USMC, etc.) exoskeletal wood with polyester laminate, and ICRC polypropylene. The prosthetic fabrication techniques looked proper from observation of some modified plaster models and finished prostheses (AK and BK). The team saw one patient, but he was a new patient who reported for evaluation, casting, and measurements for a BK prostheses and anticipated delivery in two weeks. The orthotic fabrication is conventional metal and leather or polypropylene. POLUS Center of Massachusetts provides financial, material, and human resource developmental resources to establish this center to fill the void left

by the termination of the Mercy Ships "Operation Sea Legs" project. That prosthetic containerized lab was shipped out of the country this spring.

Needs: This facility requests financial support for the following areas as it transitions to a sustainable operation: 1) U.S. \$30,000 for components, materials, and supplies annually; 2) a vehicle to be better equipped to provide outreach services; and 3) training (preferably modular or distance training) for the two young prosthetists-orthotists on staff.

3.1.3 Orthotic-Prosthetic Workshop at La Trinidad Hospital Rehabilitation Center at Esteli is about two hours northeast of Managua (92 miles). This workshop was established by the World Rehabilitation Fund in 1990 as part of a three-year program to provide services to victims of the civil war. A tour was provided by Dr. Julio Blandon, M.D., Medical Director. The center is well equipped when the machines are in working order. At present, however, the machines appear to be somewhat exposed to the elements because the top half of the workshop walls on at least two sides are made of chain link fencing material. The staff (Carlos Castro Ramirez and Roberto Moncada) is inadequately trained to provide much more than repairs and some orthotic services such as polypropylene AFOs. There are no private fitting or casting rooms (unless those in the P.T. clinic are used), and few materials or funding for any extensive service. Patients must pay for materials or components for devices provided to them. In addition the prosthetic workshop and physical therapy gym are at the back of a large medical compound with difficult access down a dirt road. Two nearby medical ambulances could be used to transport patients from this hospital to Managua for more extensive services.

Needs: 1) Upgrade training for the two prosthetists-orthotists on staff; 2) upgrade the facility access driveway so beneficiaries can easily go to the facility; 3) maintain machinery; 4) create a private patient contact room; and 5) acquire components, materials, and supplies to provide P&O services to beneficiaries.

3.2 Other

Esteban Barahona said there was some type of P&O service at Juigalpa, Nicaragua. We heard no other information about this work.

4. El Salvador

El Salvador is the smallest country in Central America, encompassing 8,124 square miles which is one-sixth the size of Nicaragua but has a population almost one-half larger, according to 1997 population figures of 5.9 million people (94 percent are reportedly mestizo [of Spanish and Indian extraction], 5 percent are Indian). The country is divided into 14 political departments. San Salvador (est. pop. 493,200), Santa Ana in the West (est. pop. 237,600), and San Miguel in the East (est. pop. 222,100) [said to be economically one of the better cities due to influx of U.S.\$ from families living in the U.S.], are the three largest cities. Sonsonate (est. pop. 90,318), Ahuachapán (est. pop. 87,000), La Libertad (est. pop. 40,600), and La Union (est. pop. 39,600) are other cities of reasonable size. El Salvador continues to recover from a civil war which lasted from 1980 –1992. It has, however, received large amounts of foreign aid in the process. Although one of the stronger regional economies, unemployment is still said to be high and illiteracy was at about 30 percent in 1995.¹¹ The currency is the Colon, with an exchange rate of 8.7 Colones/ U.S. \$1.00.

For purposes of medical care by the social security hospital system, the country is divided into four zones (East, Central, Municipal or Capital, and West) and is said to have 30 hospitals, including 3 medical rehabilitation centers (San Salvador, San Miguel in the East, and Santa Ana in the West—the first two have O&P labs).¹² As with other countries, there is no centralized data collection system nor a universal health identification number, although each medical center is said to have facility statistics. There are also the military and private hospital systems and clinics. We were told by Mr. Jorge Santos that a person receives a birth registration number that is the same throughout life. However, that number is not widely used on official documents. Persons receive another number when they turn 18, but can also receive other registration numbers depending on the document. (In Panama, the birth registration number is widely used for official documents such as driver's license, passport, etc.) Heinz Trebbin with GTZ estimates 44 persons (excluding ex-patriots with GTZ) work at all levels of direct P&O service provision in El Salvador, and that most of that number have direct contact with beneficiaries. The level of training and experience varies dramatically from little to significant (WRF Dominican Republic, Don Bosco University, or similar training, and/or little practical work experience to more than 30 years experience).

4.1 Institutions and Facilities Visited

4.1.1 Don Bosco University O&P School is one of the technical training schools of this university that provides technical degrees, engineering degrees, and degrees leading to licensing.

¹¹ Keller, Nancy et al (Sept. 1997); Central America on a Shoestring, 3rd edition; Lonely Planet Publications; Hawthorn, Australia – pp 457-515.

¹² Discussion with ISRI staff and medical directors.

This school provides a three-year degree of “Technique en Ortesis y Protesis.” (For various reasons many of the students thought the degree was “Tecnologo en Ortesis y Protesis,” which is recognized in many countries as a degree from a university as opposed to a degree from a technical school or a title earned from work experience.) The training is evaluated on a class-by-class basis by ISPO and can be recognized as a Category II degree with the title of “Tecnologo.” It graduated its first class last December. However, a number of students haven’t completed their final project (extended deadline–October 99), which they must do prior to receiving their diploma. Two graduates of the program are currently in Germany receiving “meister” training and will return to be professors with this program. The school provided a chart of mobility disabled for all of Latin America (1 technician per every 500 disabled persons) that indicated a need for 7,585 ISPO Category II-trained persons for the estimated 3,842,200 mobility disabled persons in a population of 480,000,000 in the 25 countries. The number of mobility disabled persons in El Salvador is estimated at 48,000 with a need of 96 ISPO Category-II O&Ps.

The cost of this education is U.S. \$2,200 per year (U.S. \$1,100 per semester) plus local living and transportation expenses estimated at U.S. \$ 3,300/year. The total cost of the three-year program would be U.S. \$16,500. That figure does not include international travel and the cost of books and incidentals. Considering starting salaries of U.S. \$1,000-\$3,000, it would take students several years on salary to recoup the expense. Top O&P salaries in the region for experienced O&P’s with years of experience are probably U.S. \$6,000 with perhaps a bit more if a person is a proprietor of an O&P facility. A few scholarships for a portion of the cost are available. The university says 80 percent of students receive some economic support, based on need with qualifiers. The university also states that the total cost of running this program is U.S. \$55,000 annually (U.S. \$2,200 per student based on a class size of 25 students) with administrative costs as well as those of buildings and maintaining workshops absorbed by the university. Some international student registrations that were to be “sponsored” by their national government or some national institution were not finalized, which left some unfilled vacancies. The University further states that if the class size falls to 10 the program will close.

There is a new orthotic and prosthetic building under construction that will house the O&P school and have an ISRI clinic on the lower level to allow staff and students opportunities for more practical experience; this will be a cost-recovery mechanism for the program.

Salvadoran graduates of the program will not be receiving salary adjustments as a result of a governmental decree mandating budgetary restraint. However, there is a proposed law mandating that each facility (public or private) have a credentialed (ISPO C II) P&O on staff that would provide additional opportunities for graduates as the country transitions to higher quality P&O services. Additionally, the school has a loan program for graduates to help start private enterprises.

There is a proposal in development for modular “*distance training*,” which would allow persons already working in the field with extensive experience to achieve ISPO C II recognition by completing five month-long modules over a five-year period in addition to other home-based

studies and a final project “exam” reviewed by ISPO International Education Committee representatives. This program is being developed to meet the need for upgrade training in the region.

At one point the university attempted to have a cooperative purchasing arrangement with other institutions in the region. Each institution needed individual invoices, however, and the arrangement broke down.

Needs: 1) Program support to allow the university to continue the program at the lowest possible cost to students. 2) Scholarship funds to provide financial assistance to as many students as possible. 3) Funds to provide textbooks to students.

4.1.2 ISRI Rehabilitation Hospital is associated with the Social Security Health system of El Salvador. It provides medical rehabilitation services to the workers of this country and their families (children to age six) through this large center and two other regional centers in Santa Ana in the West and San Miguel in the East. The ISRI rehabilitation center in San Miguel is fully equipped including a P&O workshop with one position for a prosthetist-orthotist. It has been difficult to find someone willing to move to that district. The center in San Salvador has had a large P&O lab for more than 20 years with major renovations provided by GTZ in 1993 and 1994. The lab chief’s training has involved taking some courses in Mexico. The lab is laid out well and equipped with the exception of an air evacuation or filtration system in the laminating room. It provides all types of P&O services, although the majority of its services are orthotics. It employs eight “tecnicos” in O&P. (There is conflicting information—Heinz Trebbin presents a number of 14 including 2 shoemakers, while the team’s number (14) came from a discussion with the P&O lab chief—perhaps 14 is the total number of persons working in the P&O lab). Salaries range from U.S. \$250-400/month. Some supplies are purchased locally such as crepe rubber. Many supplies are imported, but the bureaucracy makes it a lengthy process. The lab has an above-knee ATLAS prosthesis that is part of an ATLAS prosthetic limb evaluation going on in El Salvador. This prosthesis is especially made for developing countries. The only occasional problem noted by the staff is loosening of the knee friction screw; this is now being corrected with the use of “Loctite” thread-locking compound. This project is taking place at the ISRI rehabilitation facility in Santa Ana, which is an outreach site for ISRI to provide P&O services to an area that doesn’t have a P&O workshop.

Many outpatients are transported daily for services from the metropolitan area in new handicap accessible buses or vans provided through a cooperative grant with the Japanese government.

4.1.3 German Technical Assistance Agency (GTZ) has offices at ISRI Rehabilitation Hospital in San Salvador. Mr. Heinz Trebbin, orthopedic engineer (prosthetist-orthotist “meister”); Ms. Pilar Iglesias, his administrative assistant; Maritza Malara, technical assistant to the GTZ project; and Mr. Jorge Santos, GTZ driver, provide technical assistance to GTZ programs in El Salvador, including assistance to the P&O school in collaboration with ISRI. The

P&O program at Don Bosco was established with the cooperation of GTZ, which has helped to establish similar schools in Tanzania, the Peoples Republic of China, and Vietnam. The programs developed are meant to be self-sustaining programs after an initial phase of several years.

4.1.4 PODS Center: Lic. Wanda Amory, the executive director of this center, provided a tour of the facilities. It is in a two-story house with a second floor patient area that is a challenge to access. This center, which employs six P&Os, provides both conventional laminated exoskeletal and endoskeletal polypropylene prostheses. More than 50 percent of prosthetic fittings are “total contact.” Sixty-three percent (63 percent) of the fittings are for injuries resulting from the war or mines. There are *not* many new mine-injured beneficiaries being treated by this center. It has fit a total of 1,041 patients since 1994. This center provides outreach activities (evaluation, measurements, casting, and fitting) to a large area of the country through its mini-workshops. The center has six mini-workshops in the country where patients can be seen to service minor repairs. Each week a mobile clinic will go to one of the mini-workshops to see at least five patients. They choose quality components for durability, which for the moment means mostly importing low-cost quality components (including SACH feet from the United States).

We observed two BK prosthetic replacements. We evaluated the fit of both old and new prostheses and interviewed the amputees. The old prostheses were of quality exoskeletal design and construction having lasted several years. The new fittings also seemed to be biomechanically well designed. The fit and dynamic alignments seemed to be very good. There were some R&D activities taking place there with an exoskeletal knee.

Mr. Dave Evans, a U.S. prosthetist and consultant for the prosthetics program of Veterans International, was instrumental in the establishing this program. It has trained the disabled to provide P&O-related services—19 of its 23 employees are physically challenged. Patients receive a socio-economic evaluation that determines their *cost sharing* of service. If they cannot afford the cost, they apply to a fund for assistance. The team was impressed with the center’s presentation at the POWER Nicaragua conference in January 1999. It was the first time an NGO attempted to do total costing of its services and address cost-recovery mechanisms in detail. This was probably the best center visited by the evaluation team in terms of quality of service and overall organization. In terms of quality of services provided, the only other one to rival it was AGREL in Guatemala.

Needs: 1) Financial/technical assistance for research and development work; 2) financial assistance for materials, supplies, and components for ongoing efforts to provide P&O services to the people of El Salvador who might not otherwise have the opportunity to receive those services; and 3) training for staff.

4.1.5 CERPROFA Military Hospital Medical Rehabilitation Unit is run by Captain José Obdulio Marroquín A., “Tecnólogo en Prótesis y Ortesis,” director of the unit. This is a small

medical rehabilitation unit, but it appeared to be efficiently run with all the essential services available. The center was created by law in 1984 and began providing services in June of 1985. It provides services to those injured by war with accurate statistical data indicating 10,404 former soldiers have some type of disability. Of those disabled soldiers, 2,215 are amputees (21 percent) with lower limb amputations (+/- 90 percent BK). Less than 20 orthotic devices per month are currently provided by the center. About 75 percent of the amputees have returned to agricultural work. However, basic educational and work training activities are provided and the institution cooperates with the Ministry of Labor for job placement activities. Six prosthetists (all disabled vets) are employed by the center. The purchase of supplies and components can take 45-60 days due to a competitive bidding process that involves third-party local suppliers. Many supplies are ordered on an annual basis, for instance 300 prosthetic feet are ordered annually. Some outreach services are provide monthly in Santa Ana and San Miguel.

All of the unit's work in prosthetic fabrication is exoskeletal in nature. Imported Kingsley prosthetic SACH feet last up to six months in agricultural work and locally produced cuff suspension straps last 6-7 months. There were no reports of broken ankle blocks, although they may rot due to work in wet fields. There are occasional reports of socket fractures. When questioned about alternative prosthetic systems, the director said he would be willing to participate in evaluation projects if amputees were willing. He doesn't feel amputees would be willing to accept lower-quality devices because of the imported systems they have used already. WRF provided components to fabricate 700 prostheses between 1995 and 1997.

The chief of the prosthetic lab is a WRF Dominican Republic graduate from the 87-88 program. Additional cooperative training has been provided by the U.S. Army (since 1986) and by the lab chief. Two persons attended Don Bosco University's P&O program with their salaries paid, but they were given no scholarship assistance. They had to sign extended work contracts to be completed after graduation. No salary adjustments were given upon graduation due to budget constraints.

Needs: 1) Prosthetic components and supplies; 2) walking aids/mobility aids: wheelchairs, crutches, and canes; and 3) program assistance for the creation of microenterprises to help reintegrate the handicapped into society.

4.1.6 FUNTER Outpatient Medical Rehabilitation Center is funded by the "TELETON" charitable fundraising project. It occupies a large, modern, well-equipped and well-staffed facility in the west of the city. It has a full range of medical and social rehabilitation services, including job placement services, serving all age ranges. There is a law in El Salvador that companies with at least 100 employees must hire two handicapped workers. It provides some outreach activities into the country through a mini-workshop and outreach team activities. Vocational and social rehabilitation worker assessments of physical and vocational needs can take place at the community level in some of the outreach activities in all four zones. Services are paid for on a sliding scale depending on need, and there are no restrictions to access services at the project. The center feels it is providing the largest number of services to persons without

economic resources to pay for these rehabilitation services. FUNTER built the ISRI rehabilitation centers at Santa Ana and San Miguel and sees patients at these facilities through a cooperative arrangement with ISRI.

A large, extremely well-equipped P&O workshop employing six P&Os provides a wide range of sophisticated P&O services. The workshop produces approximately 30 prostheses and 70-80 orthoses per month. There are some R&D projects happening at the workshop pertaining to cosmetic hands and gloves as well as prosthetic partial foot restorations.

Needs: 1) Research and development of low-cost components; 2) ongoing activities of the foundation including outreach; and 3) general needs in the area of rehabilitation services: the need to educate and advocate for prevention activities and the development of reliable databases on the needs of the handicapped.

4.1.7 Discussion with Current and Former Don Bosco University P&O Students: Time did not permit a lengthy discussion with students at the university, although the students had a number of concerns, including the following:

- 1) The degree title “Técnico en Ortesis y Prótesis.” The students feel they were led to believe (from course degrees and early discussions about the school during visits by the school staff to their countries) that the degree was “Tecnólogo en Ortesis y Prótesis,” which is recognized in many countries as a degree from a university as opposed to a degree from a technical school or merely a title earned with work experience. It is the team’s understanding that some students left the program as a result of this issue—they did not believe ISPO recognition as category-II P&Os has any economic value in applying for, or returning to, positions in P&O workshops. They said ISPO is not their government or the institution that pays their salary.
- 2) Some students questioned the ability of newly graduated students to teach the next class. They also had questions about the BUFA training in Germany that two former students are receiving prior to returning to be professors at Don Bosco.
- 3) Some students felt they were led to believe they would have scholarship funds to help them afford to attend this program.
- 4) Some students said they thought they would have access to student housing *on campus*, which was not the case.

4.1.8 Private Facilities

4.1.8.1 General Discussion: In discussion with prosthetists at ISRI, it was stated that many patients go to private facilities because they can choose the type of service, and the prosthesis can be made faster (it takes one to two months in public institutions). Almost all of the service is

done in the capital because people don't want to move to the country and away from these services. Private facilities pay import taxes of about 15 percent. An estimated seven persons work in private practice.

4.1.8.2 Aparatos Ortopédicos Lara in San Salvador is run by Mr. Salvador Lara Méndez, a prosthetist-orthotist. Mr. Salvador attended the team's meeting with the students. The orthopedic workshop is run from his home. Mr. Salvador made numerous comments that over the years free services provided by international assistance have adversely affected his business. He stated during this visit that his business has lost 50 percent of its volume and revenue during the last 10 years due to these so-called free services. Mr. Lara provides all types of prosthetic services from imported materials. He states that he has to pay import taxes, which are not paid by public institutions or international aid programs.

4.1.8.3 Centro Ortopédico Alameda in San Salvador is run by Mr. Carlos Elias, a prosthetist-orthotist.

4.1.8.4 Ortopédia Murillo Gueverra is run by Francisco Murillo and Jaime Gueverra. Both men are prosthetists-orthotists. This facility is also in San Salvador.

4.1.8.5 Centro de Ortopédia Técnica is run by Jorge Alberto Quijano C., an orthotist-prosthetist with 30 years experience.

4.1.9 Other Known Activities:

4.1.9.1 Wings of Calvary Prosthetics Project is a U.S. church-related aid project initiated by Mr. Roy Snelson, C.P.O. The project's goal is to provide temporary prefabricated BK sockets on a non-adjustable pylon with a prosthetic SACH foot (the plastic "ped" that was used in previous years wasn't well received because it was unnatural), a suspension strap, prosthetic "socks," and athletic shoes. This effort is a temporary solution to help meet the needs of the estimated 10,000-15,000 amputees in El Salvador, who have injuries that are a result of the civil war. This would help in a transitional phase by allowing these persons to be followed-up and eventually fit with definitive or permanent prostheses by the local pool of trained prosthetists. Mr. Snelson states that 5,000 devices have been given out during short medical mission trips where persons were "triaged"—only those who could be fit with such a system were accepted. More information can be obtained about this program from the ISPO-published report on the 1995 Phnom Penh

consensus conference on “Appropriate Prosthetic Technology for Developing Countries.”¹³ Comments received from several sources during this trip were not positive regarding this system indicating it was often used just for its usable items, such as prosthetic feet, socks, and shoes.

4.1.9.2 ASALDIC: The contact person for ASALDIC is Mr Jorge A. Quijano C. This organization helps former guerillas obtain access to medical rehabilitation and other social services.

4.1.9.3 ALGES is an organization of disabled persons in El Salvador. Heinz Trebbin says it has approximately 2,000 members.

¹³ Day, H.J.B., et al (1996) (pp. 106-109); Report of ISPO Consensus Conference on Appropriate Prosthetic Technology for Developing Countries (held June 5-10, 1995 in Phnom Penh, Cambodia); ISPO publication; Copenhagen, Denmark. (Some comments in this paragraph were developed from a report by Mr. Snelson at the ISPO conference in San Salvador in June of 1999.)

5. Guatemala¹⁴

Guatemala has a land area of 42,042 square miles, which is slightly smaller than Honduras (about 15 percent smaller than Nicaragua). The country is divided into 22 political departments. Its topography varies from mostly mountainous in the West (with peaks as high as 12,000 feet) to coastal lowlands in the East and vast jungle lowlands in the El Petén region (site of the Tikal Mayan ruins). Its many active volcanoes make it a prime earthquake region—a major earthquake occurred in 1976. Guatemala City (est. pop.- 2,000,000) is by far the largest city; Antigua (pop.- 30,000) was a Spanish colonial capital and the first capital of Guatemala until the great earthquake of 1773; Quetzaltenango (pop.- 90,000) and Huehuetenango (pop.- 20,000) are in the Northwest mountain area along the interamerican highway; Retalhuleu (pop.- 40,000), Mazatenango (pop.- 38,000), and Santa Lucía Cotzumalguapa (pop.- 24,000) are on the Pacific slope on the coastal highway; Cobán (pop.- 20,000) in the middle of Guatemala at the South of El Peten is in the Eastern lowlands several hours northeast of Guatemala City and a coffee growing area; Chiquimula (pop.- 24,000) is a tobacco growing area in the Southeast near the El Salvador/Honduras borders; and Puerto Barrios (pop.- 35,000) is on the Gulf of Honduras—a major tropical fruit shipping area until the 1960's. These are the only Guatemalan cities or towns of reasonable size, although other tourist towns see a lot of foreign visitors. As with other countries in the region the rainy season is mainly from May to October, except in the Eastern lowlands where it rains most of the year.

Guatemala has a great deal of diversity in regards to its population of 10,000,000 people. As much as 50 percent of the population is of pure Mayan descent.¹⁵ Twenty-one different Mayan languages are spoken throughout the country (most Mayan men also speak Spanish). The majority of the balance of the population is mestizo (called “ladinos”), with a small number of the balance being either of pure European or pure African descent. Spanish is the official language. Adult literacy is said to be about 65 percent of men and less than 50 percent for women. Because of their agrarian lifestyle, Mayan children are even less formally educated due to their fieldwork, which often falls during the normal school time. It is estimated that about 75 percent of Guatemalan children attend compulsory primary school and about 25 percent attend secondary school.

The Guatemalan currency is the Quetzal with an exchange rate of about 7.5 Quetzals/U.S. \$1.00. Guatemala's GDP in 1994 was almost twice that of Nicaragua or Honduras.

Guatemala suffered a 36-year civil war in which an estimated 200,000 persons were killed and 1,000,000 persons were displaced. U.S. aid was cut off twice during that time due to human

¹⁴ Most of the information in this section was developed from this book: Keller, Nancy et al (Sept. 1997); *Central America on a Shoestring*, 3rd edition; Lonely Planet Publications; Hawthorn, Australia; pp. 95-253

¹⁵ Ibid.

rights violations and the Guatemalan government's failure to investigate the same. The civil war ended when peace accords were signed on December 29, 1996.

Guatemala is well developed in terms of medical rehabilitation care in the capital. Hospitals and other service providers functioning today in Guatemala City are the Social Security Hospital with a very large medical rehabilitation department including a large P&O workshop, AGREL, which is modern and well equipped in terms of the services it provides (including sponsorship of amputee and special-Olympics-type sports events); Hospital de Infantil with an orthotics department; the military hospital-CADEG-with a new, small well-equipped P&O workshop; and at least one private P&O clinic run by Jose Miguel Martinez Bran. WRF provides P&O services to private patients. Dr. Ronald Contreras, M.D., estimates that four persons are working in private practices (usually run from someone's home). The only other rehabilitation and P&O services in the country are said to be in Coban, approximately four hours northeast of the capital.

No other services are known to exist outside of Guatemala City. Dr. Contreras estimates that there are a total of 36 persons in Guatemala are working in direct P&O service provision with wide-ranging educational and work experience, including bench technicians and orthopedic shoemakers. Casa Medica is a distributor of medical supplies and P&O components and Dr. Contreras said there is one other supplier of these goods in the capital.

A regional hospital was being built in Huehuetenango (extreme northwestern Guatemala) in the late 1980's, but there is no rehabilitation unit in that hospital or any other place outside of the capital according to the chief of the Social Security Hospital whose jurisdiction it falls under. Because of their agrarian lifestyle and indigenous languages, most of the large Mayan Indian population are not covered by any national health programs, making it difficult for them to access the system due to non-coverage and travel distances. Languages can also be a barrier to accessing public health services, since many Mayan Indians don't speak Spanish or Spanish is their second language. The national highway system has been in reasonable repair, making most of the country accessible, but because of bandits it can be dangerous to travel the highways at night or when they are sparsely traveled. The country experienced some destructive effects recently from hurricane Mitch.

5.1 Institutions and Centers Visited

5.1.1 FUNDABIEM is a Teleton (Guatemala) project integrated rehabilitation center providing medical and social rehabilitation services. It is a large, well-equipped center providing a full range of services to all age groups. It has at least one center outside of the capital in Chiquimula.

The P&O lab occupies a relatively small area with a room for fabrication, a room for casting/fitting, and a larger common room that it shares with the maintenance department. It has three P&Os who have received minimal training in Brazil, Costa Rica, and Mexico (three weeks with a Hesperian Society project at a hospital). Salaries range from 1,500-2,000 Quetzales per month (U.S. \$200-267 per month). The facility has chosen to use the wood knee/shin and SACH

feet manufactured by CENAPRORTO in Managua, Nicaragua. Of 90 such systems fit last year, 10 persons stopped using them in less than a year due to weight and durability issues. The prosthetists said the foot is not very durable.

Needs: 1) Facility upgrade; 2) alternative component choices; 3) upgrade training for practitioners; and 4) better ability to provide outreach activities.

5.1.2 IGSS Medical Rehabilitation Hospital is a large hospital with a large medical rehabilitation department¹⁶ including a P&O workshop and the IGSS medical rehabilitation center associated with the social security system, which provides health benefits to those employees whose employers pay into the system. The medical director, Dra. Carol Mendoza M., gave a brief tour of the hospital and the P&O lab with the chief of the workshop, Juan Jose Garcia. Prosthetic fabrication is of exoskeletal design using components imported from the United States. Orthotic fabrication is both conventional metal and leather and polypropylene plastic. The lab is reasonably well equipped but could use some upgrading. Some metal orthotic components are made locally, but the aluminum is too soft and bends easily. This hospital provides integrated rehabilitation services. It has a large outdoor “all terrain” gait training area and wheelchair sports basketball court. No outreach services are provided to the country by the institution. Salary range was reported to be U.S.\$ 133-467 per month (Q1,000-3,500 per month).

Needs: 1) Upgrade training for P&Os; 2) quality locally produced P&O components; and 3) some facility upgrade.

5.1.3 AGREL Rehabilitation Center: AGREL was established in 1957 as a foundation and its P&O workshop began in 1964 with Esteban Barahona as its first chief. Arq. Maria Eugenia Gonzalez is the director. AGREL is modern and well equipped in terms of the services it provides, including sponsorship of amputee and special-Olympics-type sports events. The “Sports Games on Wheelchairs “ event in fall 1999 is expected to have 400 participants. The staff feels these types of activities are an important part of a patient’s psychosocial reintegration into society. Also, the staff only uses imported prosthetic components from the United States or Europe because it has a known quality consistent with their policy of only providing the best quality of service. Beneficiaries pay for services according to economic means as assessed by a social work study. Foundation funds to sustain the center come from private sources. Ms. Gonzalez mentioned a statistical survey project to determine the total number of amputees in Guatemala—not just those that are war related, but from all causes.

Needs: 1) A national survey of the numbers of amputees in Guatemala from all causes and 2) continued support of physically handicapped Olympics style games.

¹⁶ The medical director confirmed that approximately 600 patient visited each week.

5.1.4. CADEG Military Medical Rehabilitation Center is where the team met with Colonel Thelma E. Gramajo de Bolanos, rehabilitation center chief and Major Gerardo Leche Marroquín, public relations advisor. There are some R&D activities at the P&O facility. It also does some outreach in the eastern part of the country. Only military war disabled are treated here. The center is relatively new and it currently only provides lower limb prostheses. Other prosthetics and orthotics are referred out. Because most of the people who might be eligible for P&O employment have had only a primary education, it is difficult to find persons who could attend the Don Bosco University program (only about 3 percent would qualify). The prosthetists are currently in long-term upgrade training in cooperation with CERPROFA in El Salvador. There are 10-week cycles of training. The center would like to send at least one prosthetist to get superior training. Machinery for the lab was donated by the European Economic Community. The salary range was reported to be U.S. \$160-307 per month (Q1,200-2,300 per month).

Needs: 1) Additional P&O lab upgrade; 2) P&O upgrade training; and 3) operating expense funds.

5.1.5 WRF Project Center: The team met with Dr. Ronald Contreras, M.D., and with the prosthetist-orthotist, Amilkur Garcia, who is a graduate of the Don Bosco University program working at CERPROFA. He comes from El Salvador on weekends to provide P&O service for a fee. WRF has held training seminars under the direction of Dr. Contreras on “thermoplastic strategies for prosthetics” and “modern orthotics” and is continuing discussion with the national government and members of the former opposition force (URNG) to develop a program that meets the needs of Guatemalan war victims. Dr. Contreras also reported his involvement in an upgrade training project in conjunction with INTECAP.

Needs: Financial support for upgrade training and project support.

5.1.6 INTECAP provides technical training at secondary-school level in woodworking; metalwork, including metal lathe, and all types of metal welding; hydraulics; electrical matters; and testing methods of various materials. Administrative and quality control subjects are also taught. Upper-level university students teach many courses as well as work on their own studies at this institution. Many of the instructors have received training in Germany or elsewhere. Persons already in the labor market come here for upgrade training. The center works closely with industry in Guatemala in setting up the program to meet its needs and for job placement. No *for-profit* work is done at this center.

This center could provide an excellent foundation for acquiring workers for local production of quality P&O components and supplies. Plans to provide some upgrade P&O training at this center are being developed. The team met with Lic. Luis Roberto Mazariegos Gómez, chief of promotion of the Business Program.

Needs: If P&O upgrading courses are to be held here, there will be equipment and materials needs.

5.1.7 Private Prosthetists

5.1.7.1 Laboratorio Amor: Jose Miguel Martinez runs a small workshop from his home. He is currently trying to upgrade it since he will be working there full time following his retirement as prosthetic lab chief at the social security hospital. The team was unable to visit this facility.

5.1.8 ISPO National Membership Society Organizational Meeting was an extra activity to assist the Guatemalans to organize a national member society of ISPO. ISPO provides a vehicle for international exchange especially in the area of education and multidisciplinary team continuing education. ISPO-Guatemala proposed by-laws have been prepared for submission to ISPO International.

5.1.9 Other Centers or In-Country Activities

5.1.9.1 Hospital de Infantil in Guatemala City is a children's hospital with an orthotics workshop employing three persons.

5.1.9.2 EDECRI in Coban is a medical rehabilitation center employing one person with an affiliation with a nearby private P&O workshop.

5.1.9.3 Transitional Foundation is a wheelchair workshop in Antigua run by Mr. John Bell with the help of a physical therapist.

5.1.9.4 Fundabiem Center in Chiquimula: The team has no additional information available except that it is a Teleton-related activity.

5.1.9.5 Reports of a Jaipur Limb Project of short duration in the country during 1991 involving 50 patients was reported by Esteban Barahona (a Guatemalan living in Nicaragua). He says that Mr. Gustavo at Fundabiem is aware of that project.

6. Honduras

Honduras is the second largest country in Central America, with a land area of 43,277 square miles that is 80 percent mountainous.¹⁷ Its eastern coast has an extension of the barrier reef that extends southward from Mexico and Belize, which makes it one of the country's major tourist attractions. Honduras is directly behind Nicaragua in terms of poverty with an estimated 70 percent of its six million population living below the poverty level and 50 percent of the population unemployed or under employed.¹⁸ In November 1998, Hurricane Mitch only exacerbated these problems with extensive flood damage in Tegucigalpa and elsewhere and with the loss of life, homes, infrastructure, and crops. The team observed a significant amount of new construction from the air on the approach to Tegucigalpa. About 90 percent of the population is mestizo (Spanish/Indian heritage) with approximately 7 percent of pure Indian descent. The lempira is the currency with an exchange rate of approximately 14 Lempiras per U.S.\$ 1.00. There is a five and one-half day work week with a minimum wage of \$2 to \$3 per day, depending on the industry. The country exports large amounts of coffee, bananas, and seafood mainly to the United States.¹⁹ Deforestation is a big problem, reported to be proceeding at a rate of 3,000 square kilometers per year.²⁰

The country is divided into 18 departments with each department said to have some form of health clinic or hospital. The country has two major cities: Tegucigalpa, the capital, (est. pop.- 785,000) and San Pedro Sula (pop.- 415,000). Several other cities exceed 50,000 in population: Comayagua (pop.- 82,000); Siguatepeque (pop.- 53,000); Puerto Cortés (pop.- 79,000); Tela (pop. - 86,000); La Ceiba (pop. - 109,000); Juticalpa (pop. - 93,000); Catacamas (pop. - 75,000); and Choluteca (pop.- 114,000).²¹

Like most countries in the region, Honduras has a national social security health system in Honduras to cover persons employed by businesses paying into the system. Children of workers are covered until they reach six years of age. The physicians with Teleton noted there is no centralized health data collection system. They also said there are no known minefields left with mine clearance being completed this year. There is anecdotal information that a Honduran citizen who is an orthotist-prosthetist living in Canada did some type of a P&O analysis with a written

¹⁷ See footnote #1.

¹⁸ Keller, Nancy et al (Sept. 1997); Central America on a Shoestring, 3rd edition; Lonely Planet Publications; Hawthorn, Australia; p.320.

¹⁹ "Destination Honduras"; 1998-1999; official visitor and tourist guide to Honduras; compliments of the Honduras Institute of Tourism, Honduras Chamber of Tourism, and the Foundation for Investment and the Development of Exports

²⁰ Keller, Nancy et al (Sept. 1997); Central America on a Shoestring, 3rd edition; Lonely Planet Publications; Hawthorn, Australia – p.316.

²¹ See # 13 above; except pp. 338-452.

report recently. In discussions with various sources it was estimated that a total of 10 persons work in direct P&O service provision.

6.1 Institutions or Facilities Visited in Honduras

6.1.1 Teleton in Tegucigalpa: Teleton, founded in 1989, is a large outpatient medical rehabilitation center in the city providing all aspects of medical rehabilitation services except P&O services, which are contracted out to Roberto Amaya's private workshop in the city. Similar to TELETON centers in other Latin American countries, this organization is funded by a televised annual telethon event that raises funds so the centers can provide services free of charge to those in need. Due to Hurricane Mitch (and national elections this year), no fund-raising event was held last year. It treats patients of all ages and also provides social integration (or reintegration) activities. The center is attractive and well kept. It was very busy during the team's visit, and each department was well equipped and engaged with patients. The center has conferencing facilities for large groups of people that could be used for continuing education or upgrading courses.

Dra. Rina Isabel Zelaya Lobo, M.D., a psychiatrist and medical director of the clinic, explained that the center had applied to USAID for funds for a P&O department, but that the request was withdrawn when project plans for a P&O department were revealed by another local medical center with a rehabilitation unit, San Felipe Hospital. She felt the patients needing service could continue to be referred to either the local private P&O workshops or to this other hospital. Orthotic and prosthetic devices seen at the center appeared to have better fabrication techniques than many other devices the team has seen. A temporary leg prosthesis with a socket made of casting material, the pylon of PVC, and a foot carved of wood are used for gait training purposes. The team believes this is an interesting innovation for the region. Some questions were raised by the staff regarding the reluctance of the local orthotist to repair orthoses; instead he would ask for an Rx prescribing new orthoses.

The team discussed what types of repairs or adjustments might be completed without prohibitive labor costs. It seems that in the region it is common practice to replace devices that in the United States might be repaired. Competition between developing services of free enterprise prosthetists-orthotists might spur development of repair services. The local orthotist-prosthetist has not been invited to attend any clinic or patient evaluations where the clinic team might have his input in prescription or treatment plan development according to the medical director. This seems to be common practice because of the perceived (or real) lack of formal education. Prosthetists-orthotists, physical therapists, and occupational therapists are not invited to present at medical rehabilitation continuing education conferences and courses for the same reason.

6.1.2 ARLES Aparatos Ortopédicos: This private P&O workshop is across the river from the hospitals and is currently not easily accessible to the physically challenged—it is at the bottom of a difficult gravel and dirt street (it is unknown what affect Hurricane Mitch had on this street).

Although all patients are referred to this office for orthotic or prosthetic services, it is not set up to receive patients. A chrome vat room is immediately adjacent to the reception area. The team did not observe any private evaluation/casting/fitting areas. Orthopedic surgical instrumentation devices and orthotic components of stainless steel and other metals (including chrome-plated steel) are manufactured at this center. Those include Ilizarov bone lengthening frames, internal and external fixators, and metal orthotic joints.

The workshop's second level houses the orthotic/prosthetic fabrication areas (including orthopedic shoes), facilities to manufacture various components mentioned earlier, presses, and other tools for other types of metal fabrication for motor vehicles or other purposes. Mr. Roberto Amaya, a prosthetist-orthotist trained in Mexico, stated that it is necessary to diversify into other services because there isn't enough P&O business to sustain his practice. He also felt that international aid projects previously in Honduras, such as the WRF project, had adversely affected private enterprise. He cited the similar effect (business reduced by half) of such projects on Mr. Salvador Lara's private P&O practice in San Salvador, El Salvador. This business could possibly be considered for locally manufactured P&O components—especially metal components. Mr. Amaya indicated that prosthetist-orthotists can earn up to \$500 per month in private practice and \$250 per month in government institutions. No comment was made on how many hours were worked to receive this salary. The team's assumption is that these rates were top wages. These wages are considerably higher than the average minimum wage of about \$60-90 per month for a 44-hour work week.

6.1.3 WRF Work (in Tegucigalpa and San Pedro Sula) that was in the city closed in 1994 due to economic difficulties. That was two years after it was turned over by WRF to a Honduran foundation headed by Mr. Mike McGee, according to Dra. Sandra Corleto de Flores, M.D., medical director of the Teleton medical rehabilitation center in San Pedro Sula. There had been a component manufacturing facility in Tegucigalpa and in San Pedro Sula with locally provided P&O services. These facilities' materials and equipment were seized to satisfy unmet financial obligations and are being warehoused in San Pedro Sula to this day.

Several people in the medical rehabilitation arena stated that there are no ill feelings toward WRF. In fact, the feelings are positive. A tour of CADERH warehouses in San Pedro Sula on two separate occasions was arranged by Dra. Corleto de Flores to see the equipment left over from the WRF project. These resources have been sitting untapped, gathering dust, and rusting or deteriorating without the staff realizing its value. The center coordinator indicated these assets are capable of being released to a worthy use. They were once offered to Teleton, but it didn't want to accept the potential legal entanglements that were associated with them. In recent years, attempts to open discussions on their use were unsuccessful. The possibility of a coordinated effort between WRF and Teleton to inventory, refurbish, and arrange the donation of these items to Teleton was discussed with both Dra. Corleto de Flores and Mr. Jack Victor of WRF. Some of the items observed were approximately 15 four-inch by eight-inch sheets of polypropylene plastic; laminating stockinettes; orthopedic shoe lasts; crutch tips; and various orthotic devices such as knee orthoses, a large Grieve oven, dust collection machines, a drill press, a shoe

machine, and an industrial band saw.

6.1.4 Hospital San Felipe in Tegucigalpa has a sizable medical rehabilitation unit with an orthotic-prosthetic workshop; an expanded physical therapy service area is being developed (it is understood to be a WHO initiative). The medical director, Dr. Naranjo , M.D., and the supervisor of the “physical therapy” department, Rosa Emelina Castellanos, P.T., arranged a tour of the hospital including the area to be improved. This area is in need of significant renovation and is now being used to store leftover supplies from Hurricane Mitch relief. Because the entrance is at the rear of the complex, the team initiated discussions on accessibility. A complex-wide master plan is in the planning stage that shows direct accessibility from the rest of the department. This is an older hospital and the entire area could use some renovation, although it seems to be adequately equipped and has an adequately-sized staff. Most of the people working in the physical therapy area do not have the title of physical therapist because their university education lasts only two years. The hospital employs no P&Os at this time.

6.1.5 Honduras Institute of Rehabilitation for the Handicapped: This institute, located in Tegucigalpa, sees Social Security Hospital patients since Hurricane Mitch damaged the Social Security Hospital beyond repair. The hospital has a small O&P workshop with a couple of employees supervised by Mr. Favio Contreras, prosthetist-orthotist, trained in the WRF program in the Dominican Republic. Observation of services in progress (without seeing patients) seems to indicate an adequate knowledge of most P&O services except in the area of AK socket model rectification. (The team was unable to visit the private workshop in the city that Mr. Contreras also operates.)

6.1.6 CADERH in San Pedro Sula is a technical training school assisted by USAID funding that provides wood and metalwork skills training to students who have completed the required six years of primary school and who will not be completing secondary or university training. The team met with Ms. Fayda T. Walstead, administrative coordinator, who explained the work of the center and arranged a tour including two visits to different warehouses to see the equipment left over from the WRF project. She indicated that it could be released to a worthy use. The graduates of this program are expected to be technically skilled laborers as opposed to administrative managers or other professions requiring higher levels of education. However, this center could provide some human resources for manufacturing or non-patient-related P&O fabrication activities. The center’s staff was in the process of making all furniture, doors, window casings, and metal accessories (gate, door, or window bars requiring decorative and welding skills) for similar training centers in other parts of the country.

6.1.7 Integral Rehabilitation Center TELETON (CRIT) in San Pedro Sula is a large outpatient medical rehabilitation center providing all aspects of medical rehabilitation services, including the Jaipur lower limb prosthetic system. Orthotic services and more sophisticated

prosthetic services are provided through local private labs. It treats patients of all ages and provides social or reintegration activities. The center has conferencing facilities that could be used for continuing education or upgrading courses.

6.1.8 Rotary (Mahaveer) Jaipur Limb Project of England was the initiative of Engineer Fausto Bogran of San Pedro Sula. The Bhagwan Mahaveer Society of India, Rotary clubs of the U.S.A., San Pedro Sula, and Teleton began its work with a prostheses “camp” in 1991 at the Leonardo Martinez Hospital in the city. Two more camps were held in 1992 and 1993. This led to the establishment of a permanent prosthetic workshop with a lab, a medical evaluation office, and a physical therapy gait training gym (fitting area, etc.) within the Teleton medical rehabilitation grounds. Since that area was opened in 1994, it has fit 737 prostheses. An occupational therapist (the only one in the rehabilitation center) trained by the project does the fittings of the prostheses. They show about a 50/50 split of AK & BK amputees with firearms having caused 6 percent of the amputations; 49 percent resulting from trauma (non-war related); and 25 percent as a result of diabetes.

A group of about 12 amputees were assembled for the team to evaluate. Due to time constraints the team dismissed those who were not wearing a limb. The balance were newly fitted amputees having had their prostheses less than two weeks. The prostheses lacked biomechanical sophistication in socket design and fabrication technique, but allowed amputees the opportunity to ambulate with a leg prosthesis. The therapy program seemed to be the strong point of the program. The prosthetic lab was modestly appointed in line with the economy of providing a simple inexpensive prosthesis. A debriefing was held in a conference room with Teleton staff involved in the program. Some items discussed after the patient evaluation sessions that were in need of improvement were prosthetic alignment, metal knee joint alignment on AKs, attachment rivets protruding into the socket, and the BK suspension strap. One patient had a distal tibial abrasion. This condition prompted a discussion of possible causes and solutions or corrections. Items that appeared good were overall height of the prostheses and knee joint height on AKs. Of little concern at this time to the patients was the color of the plastic, which was green or yellow.

This facility could be helped tremendously with the addition of a well-trained prosthetist-orthotist (ISPO C-II) and a significant upgrade in lab equipment. The team encourages preserving the private sector P&O practice in the community in any international aid P&O service upgrades.

6.1.9 Casa Ortopédica Sampedrana in downtown San Pedro Sula is owned by Mr. Roy A. Vallecillo, a prosthetist-orthotist with an empiric knowledge from work in Costa Rica and training seminars in the United States, Mexico, Costa Rica, and Panama. The team’s visit to this workshop was a pleasant surprise; it contains a “real” O&P facility with a waiting area, a receptionists/business office (with a computer), a patient contact area, and a small lab that is minimally but sufficiently equipped. Mr. Vallecillo was professionally dressed. He seems to provide a wide range of P&O services (endo- and exoprostheses as well as conventional and molded plastic orthoses) that appear to be biomechanically sound. Although the team did not see

patients, the team was able to photograph numerous items being fitted or worn by patients. Mr. Elim Ortez Amaya, prosthetist-orthotist, assists Mr/ Vallecillo in providing P&O services to patients.

6.1.10 Clinica de Zapatos y Aparatos Ortopédicos “Nuñez” in downtown San Pedro Sula was also a pleasant surprise to visit. Although simply appointed with some homemade equipment (e.g., a shoe finishing machine), it was very clean and easily accessible. There was a pleasant waiting area, an office that could double as a private patient evaluation room, and the workshop or lab. The shoes and P&O devices looked professionally done and biomechanically sound. The owner, Mr. Marcial Nuñez Florez, “Tecnólogo Ortosista-Protésista,” appeared as a casually dressed professional. His business card states he has 35 years of experience with training at the O&P school in Mexico, with additional experience and training in Guatemala and Venezuela. Mr. E.O. Amaya assists in the provision of O&P services through this clinic.

6.1.11 No Other P&O Services or Medical Rehabilitation Centers are known by the team to exist in the country.

7. Discussion of Major Recommendations

- 7.1. **Implement a national health registration number.** Since many countries in Central America already have a birth registration number, a national health registry is feasible. However, some countries give a new number when a person reaches age 18. Therefore, it would be necessary to use one number throughout a person's life if health records are to be consistent.
- 7.2. **Implement a national health database** to collect general health information and statistics, including both entrance (or birth) and exit (final) diagnoses. It would be necessary to collect information from "Social Security" hospitals, Ministry of Health hospitals or facilities, military hospitals, private hospitals, and regional or community health clinics. Detailed health information could then be retrieved as needed from the treating health centers.
- 7.3. **Develop realistic statistical numbers concerning mobility-related disabilities.**²² Numbers used to justify international aid projects are seldom based on an actual census of the population because census numbers are often nonexistent in developing countries, especially after armed conflict. However, the percentages of disabled persons in these countries are often as high as 10-12 percent of the population or more. If one were to assume that these figures relate to mobility disabled, then one could calculate the numbers needing P&O related services at +/- 3,000,000 people in these four countries. When these numbers are questioned, they are often qualified as being *all* disabled persons. In *"Guidelines for Training Personnel in Developing Countries for Prosthetic and Orthotic Services,"* published as the outcome of a 1990 World Health Organization Rehabilitation Consultation held in Alexandria, Egypt, the number of persons needing P&O-related services is stated to be 0.5 percent of a population (130,000+ for this area), with the possibility that percentage could be conservative in situations where there are outbreaks of polio, etc. In documentation justifying the need of the P&O school, Don Bosco University (funded by GTZ) quotes a figure of 0.8 percent of the population having a resultant number of +/- 220,000 for these countries. One team member, Rosie Jované, states the following for the purposes of this report regarding the extrapolation of numbers to determine the need of trained P&O's for Panama: "Panama is a clear case that demonstrates that these numbers are not according to reality." She further states that international aid agencies should

push the authorities to work on [accurate database information on mobility disabled needs].
No one really wants to do this because they can play with numbers and needs in preparing

²² "Mobility related" here means all disabilities that could benefit from the use of P&O services—lower limb, trunk, upper limb, or head.

requests for aid. I think it is important because international agencies want to help but our governments do not want to show the real statistics because they may not be as significant and/or relevant [as what is often estimated].

Panama cannot provide real P&O jobs for the seven trained prosthetists/orthotists in the country. The other team member, John Craig, can believe figures of less than one percent. This belief has been bolstered by reviews of the scant real statistical (actual census or survey) data available as well as reviews of production numbers of existing services. It appears that the numbers of amputees is +/- 25 percent of those figures. An outcome of the POWER Nicaragua conference in January 1999, estimates 16,000 mobility-disabled persons are in Nicaragua (about 0.4 percent of the population), with an estimated 4,000 amputees.

- 7.4. **Multidisciplinary team training is needed** to allow the various medical rehabilitation team members the opportunity to see and interact with each other and to facilitate the implementation of the "clinic team" approach (including P&Os) to patient care. Higher levels of training for P&O's should give them more confidence to interact with other clinic team members in actually developing an individualized medical rehabilitation program.
- 7.5. **Internationally shared funding of upgrade training should be provided for persons who have at least five years of work experience** and can pass entrance exams using the GTZ/Don Bosco "distance learning modules."²³ A significant number of prosthetists and orthotists in the region are already partially trained in other international programs. It is strongly recommended that they be included in any regional master plan by giving them and existing P&O lab supervisors who are not nearing retirement priority inclusion in these upgrade training programs. It could be expected that they would be required to sign reasonable contractual agreements of employment or educational loan repayment as a condition of any institutional sponsorship in these programs. To the extent possible (two to four weeks), locally available courses of short duration should be made available.
- 7.6. **Continued support should be given to the Don Bosco/GTZ University-level prosthetics/orthotics training program.** Support that would reduce actual student costs such as funding for dormitories, facilities, equipment, teaching materials, or textbooks may make it easier for students or sponsors to fund this education in the near future as the region tries to build its economy. Current registration is 11 students, but potential class size is 25 new students per year. Student issues such as underqualified professors (newly graduated students with insufficient practical clinical experience) teaching classes, and the professional title earned by their degree should be addressed.

²³ This proposed project is in the planning stages between Don Bosco University and GTZ.

- 7.7. **Develop a scholarship trust fund to assist in the payment of university attendance fees** for P&O's at Don Bosco University in El Salvador. Fees are currently estimated to be \$2,200/annually for registration plus any textbook fees and approximately \$3,300/annually for local housing, food, and transportation expenses.
- 7.8. **Change the title earned with the ISPO Category-II university diploma** from “técnico” to “tecnólogo” in prosthetics and orthotics or alternatively to “prosthetist-orthotist with three years university level training” including a retroactive change to diplomas already earned. There is currently no way to differentiate between “técnicos” trained “on the job” and “técnicos” with a university degree that would normally entitle them to increased salaries and job promotions. In some countries, there is a national recognition of this difference in title. ISPO Category-II recognition alone is not sufficient to help graduates in their own country to obtain better positions or pay because of national professional standards regulations.
- 7.9. **Establish realistic numbers of ISPO Category-II trained prosthetists and orthotists needed in each country** at the current time with a long-term calendar of upgrades to Category II needed as the countries continue to develop. It is unrealistic to expect there to be 435 fully trained ISPO Category-II prosthetists-orthotists within 10 years when there are currently 115 persons working in prosthetics and orthotics workshops, including shoemakers and those without patient contact. This will put undue burdens on governments and institutions who must hire these people or leave trained persons without jobs. However, all P&O labs or workshops should have at least two fully trained (both P&O) ISPO Category-II²⁴ persons. Outreach team leaders should also be fully trained ISPO Category-II people.

Other persons interacting with patients should be trained to an ISPO Category-II level in their respective areas of work and/or supervision (i.e., all aspects of orthotics, all aspects of prosthetics, AK/BK prosthetics, upper limb prosthetics, lower limb orthotics, upper limb orthotics, and spinal orthotics). These persons could be upgraded to higher levels as needed to fill open positions. The United States, with 275 million people and close to universal coverage in respect to third party payment of most of the costs of service has 3,366 ABC certified practitioners: 1,125 Certified Prosthetists and Orthotists (CPOs); 1,094 C.P.s; and 1,147 C.O.s. These are ISPO Category I/Category II or equivalent.

- 7.10. **Provide adequate technical training to all support personnel**, such as non-patient interactive technicians, office/management personnel, and materials management persons. These programs might be developed within existing frameworks of technical schools in Guatemala, Honduras, or both.

²⁴ ISPO Category-II training denotes a specific level of internationally recognized standards for P&O professionals.

- 7.11. **“Immediate need” (short duration) projects should be required** to demonstrate a plan of patient education for the amputee or other physically challenged person and the family to care for the patient’s prosthesis or orthosis. The project should also show what services are available or will be provided for maintenance and follow-up care.
- 7.12. **Development or improvement of prosthetic and orthotic [P&O] workshops or labs** should be given a priority in regards to accessibility, human resources, facilities, equipment, and the types of services they are permitted to provide that are equal to other facilities and services. Many P&O workshops visited were not easily accessed by patients or beneficiaries in need of the services, were staffed by poorly trained personnel, had limited facilities and equipment, or were using inferior materials and components to provide services. Overall cost of services is a consideration, but it should be part of the institutional budgetary process that still allows a medical rehabilitation service to provide the lowest cost-quality services possible to the physically challenged person so they can be adequately reintegrated into society.
- 7.13. **Medical rehabilitation (including P&O) services should be decentralized from the capital cities** to allow maximum accessibility to those in need. Since most countries have a district hospital system, agreements might be arranged to provide these services at those centers either by established medical rehabilitation wards or by outreach teams visiting the centers on a scheduled basis. The more difficult services could still be referred to a major national treatment center. Salary differential programs may have to be implemented to encourage trained medical rehabilitation team members to move away from the capitals.
- 7.14. **Appropriately supervised CBR program²⁵ should be implemented** (or used if already existing). This effort would include workers trained to recognize mobility disabilities, refer persons to appropriate medical rehabilitation centers or services, provide minimal rehabilitation services (such as PT exercise or gait training), provide minor repair services, and be able to provide regular follow up to beneficiaries of medical rehabilitation services. Physically challenged service beneficiaries should be used where appropriate.
- 7.15. **Develop (or find existing) manufacturing capabilities in the region** of quality, regionally appropriate prosthetic and orthotic components and supplies, such as wood knee/shin components; prosthetic feet; leather components, straps, and shoe soles; metal joints, stirrups, and sidebars; stockinet (cotton, nylon, and fiberglass); prosthetic socks; crepe rubber; and various prosthetic foam lining materials. These programs might be

²⁵ Reference ISPO document "EB59.3.4.5": "Relationship between Prosthetics and Orthotic Services and Community Based Rehabilitation"; 25 April 1999 and PAHO/WHO Tripartite Initiative "Supporting Landmine Survivors in Central America," key objective #1 in section #1 pp. 16-17.

developed with the help of the department of engineering and technical schools of University Don Bosco or technical schools in Guatemala (INTECAP) and Honduras (CADERH). There is also a prosthetist-orthotist in Tegucigalpa who has a metalwork shop with lathes, presses, chrome vats, etc. He makes stainless steel orthopedic surgical instrumentation such as Ilizarov bone-lengthening frames and external fixators as well as metal orthotic joints.

- 7.16. **Develop a machinery and equipment bank** that might accept used, but serviceable, P&O machinery and equipment for lower cost purchase by those in need in the region.
- 7.17. **Develop a private enterprise bank** to loan money for P&O private lab start-ups.
- 7.18. **Allow government facilities the ability to solicit competitive bids** directly from manufacturers for imported components. The competitive bidding system in use in the region, which requires working through local distributorships, appears to add significant costs to imported components.
- 7.19. **Develop a workable materials purchasing co-operative** to take advantage of quantity discounts and shipping expense savings. It should ensure that the actual purchasing entity is indemnified against liabilities of the other members and that each member has the ability to receive a shipping receipt and invoice in their name.
- 7.20. **Allow private facilities to participate in providing services** from internationally funded projects with guidelines established to maintain quality and timely delivery of services. This should be done at a price that recognizes *real costing*, perhaps by a bidding process or acceptance of realistic price guidelines. Providing specific components for the fabrication of each individual prosthesis/orthosis might be a way of containing costs (e.g., foot, ankle block, knee/shin; ICRC modular components; orthotic joints). Tax breaks should be given on imported components and tax credits on income taxes for “charitable” work (without profit).
- 7.21. **Include an “Impact Statement” on private sector services in any regional master plan** and encourage inclusion of the private sector in providing medical rehabilitation services and upgrade training. The private sector is an important mechanism in building sustainability. If economic resources are available, then the private entrepreneur is the one who really takes a risk by establishing his or her business. But he or she is also the most motivated to work hard to make his or her business succeed. The entrepreneur is also the one who can try different prosthetic systems to meet demands of the beneficiaries. By being allowed to make a profit, the entrepreneur is willing to attend continuing education courses and try new and better services. Hopefully, the entrepreneur will be able to provide some of the services that would otherwise be provided outside of the country (in the United States). If the entrepreneur is challenged by competing private services, there are some checks and balances to quality and price.

Institutional settings must provide whichever systems are mandated by administration with persons who are not always fully qualified in terms of education and experience, and those systems and personnel are usually chosen solely on the basis of economic considerations—and at times without regard to quality. A center can provide hundreds of services that look good on paper or in public reports, but if the beneficiaries cannot fully use those services to reintegrate into society, those services are not worth whatever price was paid for them.

- 7.22. **P&O workshops should be encouraged to document services**, including patient evaluation information, type of service rendered (including componentry used), patient and family education provided, and if follow-up care is needed or provided.

Appendices

Scope of Work

From July 16 to July 31, 1999 the Patrick J. Leahy War Victims Fund (LWVF) contracted two consultants to assess the public and private sector provision of prosthetic and orthotic services in five Central American countries. Namely, Nicaragua, Guatemala, El Salvador, and Honduras.

The consultants, Mr. John Craig and Ms. Rosielena Jovane, both CPOs, will travel to Central America to gather information on the current status and future plans of medical and social rehabilitation services, including outreach, in the countries noted above. In particular the consultants will assess what effects international aid programs providing free services have had on the private sector and whether those agencies receive special services and/or privileges that might help the private sector if it were able to have the same privilege.

In addition, Mr. Craig will assess the current technical and programmatic status of both the Jaipur and Atlas systems in Panama City, Panama.

Mr. Craig and Ms. Jovane will conduct their assessment through face-to-face interviews with clients, public and private sector service providers, and government officials and offices. They will also conduct, as appropriate, desktop research and a thorough review of client records and organizational reports and evaluations.

Itinerary

- July 18:** John Craig flies to Panama. 2:30 p.m. flight delayed and arrives in Panama at 8:00 p.m.
- July 19:** Afternoon flight leaving Panama to Managua via San Jose, Costa Rica. Esteban Barahona met us at the airport to discuss next day's work schedule. This was a holiday in Nicaragua so we changed flight from early morning to afternoon. Lodging at Las Mercedes Hotel directly across street from airport for two nights.
- July 20:** 6:30 a.m. departure to Leon via rented car to arrive at 8:30 a.m. Visit Walking Unidos P&O clinic. Meet with staff including Santiago Castellón R., Director, tour facility, interview patient. Mr. Barahona, Prosthetist-Orthotist, is a paid consultant to this clinic. Leave at 10:00 a.m. for trip to Esteli to visit La Trinidad Hospital with former WRF P&O workshop and physical therapy clinic. Meet with Dr. Julio Blandon, M.D., Medical Director, to tour P&O workshop and meet with prosthetists-orthotists, Roberto Moncada and Carlos Castro Rameriz, and tour physical therapy clinic and meet with Saul Castillo, Physical Therapist. Leave at 1:45 p.m. for Managua to arrive at CENAPRORTO at 4:00 p.m. Meet with Dr. René Palacio Vangelderen, D.D.S., General Manager, and Lic. Luiz Velasquez, Sub-Director of Production, the P&O workshop supervisor. Tour P&O workshop with staff, visit physical therapy gym and multi-purpose outdoor gait training area, look at mobile lab and discuss its former and current function. Meet with medical director and P&O workshop supervisor to discuss medical rehabilitation and P&O needs.
- July 21:** 6:50 a.m. flight from Managua to San Salvador, El Salvador. Pilar Iglesias of GTZ made all in-country appointments for our trip. Mr. Jorge Santos, GTZ driver, met us at airport and took us directly to University Don Bosco for a 9:00 a.m. meeting with the president and staff of the university including financial people: Ing. Federico Huguet, President; Ing. Ricardo Siliazar, Faculty Dean of Technical studies; Lic. Baltazar Diaz, Vice-President of Academic Studies; Lic. Cristina de Barahona of Student Services regarding scholarships; Dr. Harold Johnson, M.D., Director of the O&P Program; Lic. Manuel de Jesus Velasco, Finance Director, to discuss the three-year university P&O training program, plans, and needs. Heinz Trebbin was out of the country and unable to meet with us. Dr. Johnson took us on a tour of the campus facilities for engineering and technical training including the P&O training areas. The future P&O school and outpatient clinic building is under construction. Lunch at GTZ office at ISRI with a 2:00 p.m. meeting with the ISRI medical director; Rosa Amelia Argueta, Administrator of CAL/ISRI; Maritza Malara, Technical Assistant for Project ISRI/UDB/GTZ; Francisco Murillo, orthotist-prosthetist trained at WRF program in Dominican Republic & chief of P&O lab; Dr Flores, M.D., the medical director of the ISRI rehabilitation hospital and P&O lab in San Miguel (eastern El Salvador). During this two and one half hour meeting we discussed the program of ISRI both in San Salvador and on a national scale. At 4:00 p.m. we went to Funter medical rehabilitation center (TELETON – El Salvador) where we met with the director, Dra. Sonia Maribel Minero M., M.D., to discuss the work of the foundation. We then toured the large P&O lab and discussed its activities with the chief

of production, Mario Antonio García, including some of the R&D activities. Lodging for the two nights at Hotel Nice 'n Easy, a bed and breakfast hotel in San Salvador.

- July 22:** 7:30 a.m. meeting at ISRI to see patients. However, patients are normally scheduled on Wednesday and it appeared that they didn't want to return on Thursday for a clinic. Toured P&O workshop and discussed the history and workload of the lab including the "Atlas Prosthetic Evaluation Project" being conducted there. A 10:00 a.m. meeting with the staff of PODES, tour of facilities, and two patient interviews with observation of new prosthetic fittings were completed. Also discussed their R&D work for local production of components. Between 11:30 a.m. and 12:30p.m. met with the director of the rehabilitation unit at CERPROFA, the military hospital in San Salvador, to discuss status and needs. Completed a tour of the unit including the P&O department. Returned to University Don Bosco for a 2:00 p.m. "debriefing" and final questions regarding P&O training needs. Unable to finalize plans for a visit to a private P&O lab. A dinner meeting was planned with students of the University Don Bosco program—both first and second three year program students—to discuss their needs and concerns. Mr. Salvador Lara, prosthetist-orthotist, and owner of a private facility in the city also attended the dinner to discuss the impact international aid programs have had on his business.
- July 23:** 8:20 a.m. flight to Guatemala City where Dr. Ronald Contreras, M.D., (a physiatrist with two years P&O training at University Don Bosco) of WRF met team. 10:00 a.m. visit scheduled at Fundabiem. The medical director, Dra. Minor Sandoval, M.D., or the administrator, Lic, Morena Bellas, did not meet with us, but they did arrange for the supervisor of the prosthetic lab to meet us to conduct a tour of the facilities and the prosthetic lab to observe service in progress. At 11:30 a.m. we visited the IGSS medical rehabilitation center associated with the social security system. The medical director, Dra. Carol Mendoza M., gave us a brief tour of the hospital and the P&O lab. Hospital de Infantil was not on our agenda because of time constraints. A 2:00 p.m. meeting at AGREL with Arq. Maria Eugenia Gonzalez, Director, and one of the foundation board members to discuss activities of that center and to see a young patient who had a congenital transtibial amputation. Tour facilities including P&O lab. 4:00 p.m. appointment at CADEG, the military hospital, where we met with Colonel Thelma E. Gramajo de Bolanos, rehabilitation center chief, and Major Gerardo Leche Marroquín, Public Relations Advisor, and saw a Power Point presentation of their activities prior to a tour of the facilities, including the new P&O lab. A 5:30 p.m. meeting was scheduled at the military club to meet with organizational activity for ISPO national member society. Lodging for three nights was at the Suites Reforma Apart Hotel.
- July 24:** A trip to Coban (three to four hours north of Guatemala City) was cancelled because the prosthetist was not going to be there at that private lab associated with EDECRI. Instead a 9:00 a.m. visit was scheduled at INTECAP, providing technical training at secondary school level in woodworking; metalwork, including metal lathe, etc., and all types of metal welding; hydraulics; electrical methods; various materials testing methods; and others. Administrative and quality control subjects are also taught. Upper level university

students teach many courses as well as work on their own studies at this institution. Persons already in the labor market come here for upgrade training. Plans to provide some upgrade P&O training at this center are being developed. At 11:30 a.m. the team visited the WRF office to discuss their work with Dr. Ronald Contreras, M.D. The team also met the prosthetist who comes from El Salvador to provide P&O service for a fee on weekends. At 3:00 p.m. a meeting was arranged with two prosthetists/orthotists, Julio Cesar Duarte and Roberto Argueta, who wanted to discuss issues concerning prosthetics private practice and also ISPO. An evening dinner meeting was arranged with Mr. Jose Miguel Martinez B., a prosthetist/orthotist, and Arq. Maria Eugenia Gonzalez, Director of AGREL.

July 25: A scheduled trip to visit the Transitional Foundation, a wheelchair workshop in Antigua run by a Mr. John Bell with the help of a physical therapist, was canceled for a day with a less hectic schedule. John Craig took the day off to visit friends, attend church, and to observe a primary care free medical clinic being conducted by a group of U.S. physicians, nurses, and others on the outskirts of the city. Rosie Jovane met with the director of AGREL for more discussions regarding P&O services at that institution and in the country.

July 26: 6:45 a.m. flight to Tegucigalpa, Honduras, via San Salvador, El Salvador. Dr. Rina Isabel Zalaya Lobo, M.D., met us at the airport and took us to a 9:00 a.m. meeting and tour of the Teleton rehabilitation center providing all aspects of medical rehabilitation services except P&O services which are contracted out to Roberto Amaya, a prosthetist-orthotist trained in Mexico who has a private workshop in the city. While driving to other centers we were able to see Hurricane Mitch damage including the irreparable damage to the Social Security Hospital that sits on the bank of the Choluteca River running through the middle of the city. That hospital will have to be torn down. At 11:00 a.m. the team went to Hospital San Felipe where an orthotic-prosthetic workshop and expanded physical therapy service area is in the developmental stage [understood to be a WHO initiative]. Met with the medical director, Dra. Reina Ulloa, M.D., and the supervisor of the “physical therapy” department, Rosa Emelina Castellanos, P.T., who arranged a tour of the hospital including the area to be improved. Following, the team made a brief stop at the Honduras Institute of Rehabilitation for the Handicapped to visit the O&P workshop which is supervised by a WRF Dominican Republic graduate, Mr. Favio Contreras, prosthetist-orthotist. We were unable to visit the private workshop in the city which Mr. Contreras also operates. A working lunch and a trip to the bank to convert currency prior to catching the express bus at 3:30 p.m. to San Pedro Sula completed our visit to Tegucigalpa. We were picked up at 7:00 p.m. by Dra. Sandra Corleto de Flores, M.D., and transported to the Best Western Gran Hotel Sula in the city center. Two nights stay at that hotel.

July 27: 9:00 a.m. appointment at CADERH, a technical training school (assisted by USAID funding) that provides wood and metalwork skills training to students who have completed the required six years of primary school and who will not be completing

secondary or university training. Met with Ms. Fayda T. Walstead, Administrative Coordinator, who explained the work of the center and arranged a tour, including warehouse visits [two different ones] to see the equipment left over from the WRF project. She indicated that it is capable of being released to a worthy use. 10:00 a.m. to 2:00 p.m. visit to CRIT (Teleton) outpatient medical rehabilitation center for tour and evaluation of Rotary Mahaveer Jaipur Prosthetics Project patients. 3:00 p.m. to 5:30 p.m. visits to Casa Ortopédica Sampedrana in downtown San Pedro Sula owned by Mr. Roy A. Vallecillo, a prosthetist-orthotist, who is doing a wide range of sophisticated P&O services and to Clinica de Zapatos y Aparatos Ortopedicos “Nunez” also in downtown San Pedro Sula owned by Mr. Marcial Nunez Florez, “Tecnólogo Ortesista- Prótesisista,” with training/experience in Mexico, Guatemala, and Venezuela. The team had a casual non-working dinner with Dra. Sandra Corletto de Flores, M.D. (who had arranged our lodging, itinerary, and provided transportation) and her husband.

July 28: 6:55 a.m. flight via Tegucigalpa, Honduras, and San Jose, Costa Rica, to Panama with an early afternoon arrival. Some discussion of the information collected.

July 29: Preparation activities for ISPO Panama Atlas Prosthetic Limb Project fund raising event to help raise funds to purchase the components and supplies for the actual fitting project to take place in Panama City in early October. Planning meeting from 6:30 p.m. to 9:30 p.m. Dr. Armando Vasquez, M.D., (who was on a working visit to Panama) attended a portion of the meeting.

July 30: 9:30 a.m. to 1:00 p.m. The team visited CRI, a children’s rehabilitation center, in Panama City to interview nine Rotary Mahaveer Jaipur Prosthetic Limb Project patients or beneficiaries who had worn their prostheses up to two and one-half years. Also evaluated a small boy who was a quadrilateral limb amputee (bilateral transtibial and bilateral transradial) to assess the prosthetic fit and possible modifications to his leg prostheses. 1:00 to 3:00 p.m. working lunch with Mr. J.T. (Tom) Ford, President of The Foundation for the Handicapped, the group which co-sponsors this project with Rotary and provides funding. Worked on digital photos from USAID trip in the evening.

July 31: All day preparation and actualization of the Atlas fundraising event: bingo at a local casino with entertainment and lunch with donated supplemental prizes and door prizes. This event resulted in net proceeds of almost U.S. \$4,000—more than half of the funds necessary to carry out the project. Past and future beneficiaries of ISPO Panama prosthetic services helped with the planning, organization, and actualization of this project.

August 1: John Craig departs on a 10:15 a.m. flight to Dallas.

Panama

Panama is a nation of 2,655,000²⁶ people between Costa Rica and Colombia. Because of U.S. control of the Canal and U.S. economic influence, the U.S. dollar is traded as the “working currency” although the Panama government’s currency is the Balboa. Only Balboa coins are in circulation. Panama has historically been a financial center in Latin America. However, the economic embargo by the U.S. in the late 1980s and early 1990s coupled with the pullout of all U.S. forces has had a negative economic impact on the country, including its ability to provide medical rehabilitation services. ISPO-Panama’s national member society has for several years provided charitable services to as many persons as possible with *volunteer* help of its membership and the beneficiaries of those services. Through the use of donated prosthetic and orthotic components (mostly used) in a cooperative arrangement with members of USISPO and free international transport provided by COPA Airlines of Panama, services can be provided at a minimal additional costs for any additional components/supplies needed. No fees are paid to ISPO members for their volunteer services. ISPO-Panama occasionally holds fundraising activities to support this program—those continuing education programs are organized to keep costs as low as possible for beneficiaries and members. During this evaluation team’s visit ISPO-Panama received a shipment of donated plastic spinal body jackets that were eventually distributed to local public institutions for charitable use. It also held a successful bingo fundraising activity at a local casino to help fund the component purchase of approximately 30 ATLAS (Blatchford) prostheses at an approximate cost of about U.S. \$175 for the BK systems, including integrated foot and U.S. \$275 for AK system with integrated foot and single axis constant friction knee with lock mechanism. These will be used in an evaluation project of the Atlas system with beneficiaries being fit with their prostheses early in October of 1999. This project will utilize the expertise of prosthetists from Panama, Colombia, and the Blatchford company in England.

John Craig visited the CRI outpatient rehabilitation center in Panama City on Friday, July 30, to interview amputees who had been fit with the Rotary Mahaveer Jaipur Prosthetic limb system over the last two and one half years. Nine patients showed up and a personal interview was held with each person. These people had used their prostheses from one and one-half to two and one-half years. The age range was from the teens to over fifty years of age. One person with bilateral BK amputations uses his prostheses to drive a school bus. Another just completed a university architectural degree program—he wears an AK prosthesis and rides a bicycle and his only major repair was from a fall on his bicycle in which he bent the metal knee joints (there were no skin abrasions on the residual limbs). Patients did not mind the black colored polyethylene plastic used to fabricate their prostheses. However, some chose to paint or cover the prosthesis with hose to make it more cosmetically acceptable. There were no major failures of prosthetic systems. The patients have all received follow-up calls from the center to check on their progress and to encourage them to return for maintenance if needed. The endoskeletal AK knee system has essentially been abandoned due to its lower quality. This is also the case for the supracondylar cuff suspension straps that have been replaced by a stronger locally produced strap. There have been some complaints regarding the width

²⁶ Keller, Nancy et. al. (Sept. 1997); *Central America on a Shoestring*, 3rd edition; Lonely Planet Publications; Hawthorn, Australia, pp. 710.

of the Jaipur foot at the toes that makes it more difficult to put a shoe over it, and some amputees purchase an imported SACH foot to be used on their prosthesis. The BK system costs less than U.S. \$100 to provide and the AK system costs less than U.S. \$200. Each patient is asked to pay a small portion of the cost. No skin abrasions were present, but there was some minor callousing on one or two limbs.

A foam liner had been added to the sockets to better distribute weightbearing forces over the residual limb. A modification (a strip of plastic about an inch wide) was riveted slightly below the end of the residual limb to allow for the addition of a foam distal cushion for “total contact” where needed. This project is being supervised by a local prosthetist with extensive fitting experience. It seems this institution has taken steps to rectify some of the following problems encountered with other Mahaveer Jaipur Prosthetic Projects:

- Insufficiently trained persons fitting the prostheses,
- Poor suspension systems,
- Prosthetic feet that are too wide at the toes,
- Insufficient or no follow-up care provided for the amputees,
- Inability to have “total contact” distally when needed, and
- Patients were either not overly concerned with the cosmetic effect (color) or they altered it to be more acceptable.

These nine prosthetic patients, of a total number of approximately 200 who have been fit with the system, are reasonably satisfied with their prostheses. The Foundation for the Handicapped of Panama City in cooperation with Rotary International provides financial support for this project. The president of that foundation, Mr. Tom Ford, says this system is not seen as the only prosthetic solution to those Panamanian citizens who have lost limbs. He said it has been a way for the foundation to assist many more amputees to reintegrate themselves into society, where they will develop other resources to be able to afford better prosthetic systems in the future.